Faculty of Engineering
Savitribai Phule Pune University, Pune

Maharashtra, India

Syllabus

for

Fourth Year of Computer Engineering
(2015 Course)

(with effect from 2018-19)

Savitribai Phule Pune University
Fourth Year of Computer Engineering (2015 Course)
(with effect from 2018-19)

Semester I

Course Code	Course	Teaching Scheme Hours / Week		Examination Scheme and Marks						Credit	
		Theory	Practical	In-Sem	End-Sem	TW	PR	OR/ *PRE	Total	TH/ TUT	PR
410241	High Performance Computing	04	--	30	70	--	--	--	100	04	--
410242	Artificial Intelligence and Robotics	03	--	30	70	--	--	--	100	03	--
410243	Data Analytics	03	--	30	70	--	--	--	100	03	--
410244	Elective I	03	--	30	70	--	--	--	100	03	--
410245	Elective II	03	--	30	70	--	--	--	100	03	--
410246	Laboratory Practice I	--	04	--	--	50	50	--	100	--	02
410247	Laboratory Practice II	--	04	--	--	50	--	*50	100	--	02
410248	Project Work Stage I	--	02	--	--	--	--	*50	50	--	02
									Total Credit	**16**	**06**
Total		**16**	**10**	**150**	**350**	**100**	**50**	**100**	**750**	**22**	
410249	Audit Course 5									**Grade**	

Elective I	Elective II
410244 (A) Digital Signal Processing	**410245 (A)** Distributed Systems
410244 (B) Software Architecture and Design	**410245 (B)** Software Testing and Quality Assurance
410244 (C) Pervasive and Ubiquitous Computing	**410245 (C)** Operations Research
410244 (D) Data Mining and Warehousing	**410245 (D)** Mobile Communication

410249-Audit Course 5 (AC5) Options:

AC5-I Entrepreneurship Development

AC5-II: Botnet of Things

AC5-III: 3D Printing

AC5-IV: Industrial Safety and Environment Consciousness

AC5-V: Emotional Intelligence

AC5-VI: MOOC- Learn New Skills

Abbreviations:

TW: Term Work **TH:** Theory **OR:** Oral **PR:** Practical

Sem: Semester *__PRE__: Project/ Mini-Project Presentation

Savitribai Phule Pune University
Fourth Year of Computer Engineering (2015 Course)
(with effect from 2018-19)

Semester II

Course Code	Course	Teaching Scheme Hours / Week		Examination Scheme and Marks						Credit	
		Theory	Practical	In-Sem	End-Sem	TW	PR	OR/ *PRE	Total	TH/ TUT	PR
410250	Machine Learning	03	--	30	70	--	--	--	100	03	--
410251	Information and Cyber Security	03	--	30	70	--	--	--	100	03	--
410252	Elective III	03	--	30	70	--	--	--	100	03	--
410253	Elective IV	03	--	30	70	--	--	--	100	03	--
410254	Laboratory Practice III	--	04	--	--	50	50	--	100	--	02
410255	Laboratory Practice IV	--	04	--	--	50	--	*50	100	--	02
410256	Project Work Stage II	--	06	--	--	100	--	*50	150	--	06
									Total Credit	12	10
Total		**12**	**14**	**120**	**280**	**200**	**50**	**100**	**750**	**22**	
410257	Audit Course 6									Grade	

Elective III	Elective IV
410252 (A) Advanced Digital Signal Processing	**410253 (A)** Software Defined Networks
410252 (B) Compilers	**410253 (B)** Human Computer Interface
410252 (C) Embedded and Real Time Operating Systems	**410253 (C)** Cloud Computing
410252 (D) Soft Computing and Optimization Algorithms	**410253 (D)** Open Elective

410259-Audit Course 6 (AC6) Options:

AC6-I: Business Intelligence
AC6-II: Gamification
AC6-III: Quantum Computing
AC6-IV: Usability Engineering
AC6-V: Conversational Interfaces
AC6-VI: MOOC- Learn New Skills

Abbreviations:

TW: Term Work **TH:** Theory **OR:** Oral **PR:** Practical
Sem: Semester *__PRE__: Project/ Mini-Project Presentation

Savitribai Phule Pune University
Fourth Year of Computer Engineering (2015 Course)
410248:Project Work Stage I

Teaching Scheme:	Credit	Examination Scheme:
Practical : 02 Hours/Week	02	Presentation: 50 Marks

Course Objectives:

- To Apply the knowledge for solving realistic problem
- To develop problem solving ability
- To Organize, sustain and report on a substantial piece of team work over a period of several months
- To Evaluate alternative approaches, and justify the use of selected tools and methods,
- To Reflect upon the experience gained and lessons learned,
- To Consider relevant social, ethical and legal issues,
- To find information for yourself from appropriate sources such as manuals, books, research journals and from other sources, and in turn increase analytical skills.
- To Work in TEAM and learn professionalism.

Course Outcomes:

On completion of the course, student will be able to–

- Solve real life problems by applying knowledge.
- Analyze alternative approaches, apply and use most appropriate one for feasible solution.
- Write precise reports and technical documents in a nutshell.
- Participate effectively in multi-disciplinary and heterogeneous teams exhibiting team work, Inter-personal relationships, conflict management and leadership quality.

Guidelines

Project work Stage – I is an integral part of the Project work. In this, the student shall complete the partial work of the Project which will consist of problem statement, literature review, SRS, Model and Design. The student is expected to complete the project at least up to the design phase. As a part of the progress report of project work Stage-I, the candidate shall deliver a presentation on the advancement in Technology pertaining to the selected project topic. The student shall submit the duly certified progress report of Project work Stage-I in standard format for satisfactory completion of the work by the concerned guide and head of the Department/Institute.

The examinee will be assessed by a panel of examiners of which one is necessarily an external examiner. The assessment will be broadly based on work undergone, content delivery, presentation skills, documentation, question-answers and report.

Follow guidelines and formats as mentioned in Project Workbook recommended by Board of Studies.

Savitribai Phule Pune University
Fourth Year of Computer Engineering (2015 Course)
410256:Project Work Stage II

Teaching Scheme:	Credit	Examination Scheme:
Practical : 06 Hours/Week	06	Term Work: 100 Marks Presentation: 50 Marks

Course Objectives:

- To follow SDLC meticulously and meet the objectives of proposed work
- To test rigorously before deployment of system
- To validate the work undertaken
- To consolidate the work as furnished report.

Course Outcomes:

On completion of the course, student will be able to–

- Show evidence of independent investigation
- Critically analyze the results and their interpretation.
- Report and present the original results in an orderly way and placing the open questions in the right perspective.
- Link techniques and results from literature as well as actual research and future research lines with the research.
- Appreciate practical implications and constraints of the specialist subject

Guidelines

In Project Work Stage–II, the student shall complete the remaining project work which consists of Selection of Technology and Tools, Installations, UML implementations, testing, Results, performance discussions using data tables per parameter considered for the improvement with existing/known algorithms/systems and comparative analysis and validation of results and conclusions. The student shall prepare and submit the report of Project work in standard format for satisfactory completion of the work that is the duly certified by the concerned guide and head of the Department/Institute.

Follow guidelines and formats as mentioned in Project Workbook recommended by Board of Studies.

Faculty of Engineering

Syllabus

T.E. (Information Technology) 2015 Course

(With effect from Academic Year 2017 - 18)

SAVITRIBAI PHULE PUNE UNIVERSITY

The syllabus is prepared by

B.O.S. in Information Technology, Savitribai Phule Pune University

T.E. (Information Technology) 2015 Course to be implemented from June 2017

SYLLABUS STRUCTURE

SEMESTER – I

Subject Code	Subject	Teaching Scheme			Examination Scheme					Total Marks	Credits
		Lecture	Tutorial	Practical	In-Sem. Paper	End-Sem. Paper	TW	PR	OR		
314441	Theory of Computation	4	--	--	30	70	--	--	--	100	4
314442	Database Management Systems	4	--	--	30	70				100	4
314443	Software Engineering &Project Management	3	--	--	30	70	--	--	--	100	3
314444	Operating System	4	--	--	30	70	--	--	--	100	4
314445	Human-Computer Interaction	3	--	--	30	70	--	--	--	100	3
314446	Software Laboratory-I		--	4	--	--	25	50	50	125	2
314447	Software Laboratory-II	--	--	4	--	--	25	50	--	75	2
314448	Software Laboratory-III	--	--	2	--	--	50	--	--	50	1
314449	Audit Course 3	--	--		--	--	--	--	--	Grade	
	Total	**18**	**--**	**10**	**150**	**350**	**100**	**100**	**50**	**750**	**23**
	Total of Part-I	**28 Hours**				**750**					

SEMESTER – II

Subject Code	Subject	Teaching Scheme			Examination Scheme					Total Marks	Credits
		Lecture	Tutorial	Practical	In-Sem. Paper	End-Sem. Paper	TW	PR	OR		
314450	Computer Network Technology	3	-	--	30	70	--	--	--	100	3
314451	Systems Programming	4	-	--	30	70	--	--	--	100	4
314452	Design and Analysis of Algorithms	4	-	-	30	70	--	--	--	100	4
314453	Cloud Computing	3	-	-	30	70	--	--	--	100	3
314454	Data Science & Big Data Analytics	4	-	-	30	70	--	--	--	100	4
314455	Software Laboratory-IV	--	--	2	--	--	25	--	25	50	1
314456	Software Laboratory-V	--	--	4	--	--	50	50	--	100	2
314457	Software Laboratory-VI	--	--	2	--	--	25	25	--	50	1
314458	Project Based Seminar	--	01	--	--	--	--	--	50	50	1
314459	Audit Course 4	--	--	--	--	--	--	--	--	Grade	
	Total	**18**	**01**	**08**	**150**	**350**	**100**	**75**	**75**	**750**	**23**
	Total of Part-II	**27 Hours**				**750**					

314458 : PROJECT BASED SEMINAR

Teaching Scheme:	Credits	Examination Scheme:
Tutorial : 1 Hour/Week	01	Oral: 50 Marks

Introduction:

Graduates of final year IT program are supposed to design and implement projects through knowledge and skills acquired in previous semesters. Students should identify complex engineering problems and find effective, efficient and innovative ways of solving them through their projects.

In a technical seminar, students should aim to review literature in a focused way for identifying a complex problem to be attempted in their final year project. Seminar should make the student attain skills like (a) gathering of literature in specific area in a focused manner (b) effectively summarizing the literature to find state-of-the-art in proposed area (c) identifying scope for future work (d) presenting (arguing) the case for the intended work to be done as project (e) reporting literature review and proposed work in scientific way using good English.

Prerequisites:

1. Basic Communication, reading and writing skills.

Course Objectives :

1. To perform focused study of technical and research literature relevant to a specific topic.
2. To study, interpret and summarize literature scientifically.
3. To build independent thinking on complex problems.
4. To build collaborative work practices.
5. To communicate scientific information to a larger audience in oral and written form.
6. To use presentation standards and guidelines effectively.

Course Outcomes :

1. To Gather, organize, summarize and interpret technical literature with the purpose of formulating a project proposal.
2. To write a technical report summarizing state-of-the-art on an identified topic.
3. Present the study using graphics and multimedia presentations.
4. Define intended future work based on the technical review.
5. To explore and enhance the use of various presentation tools and techniques.
6. To understand scientific approach for literature survey and paper writing.

Guidelines for Project Based Seminars

1. A project group consisting of 3 to 4 students shall identify problem(s) in Computer Engineering / Information Technology referring to recent trends and developments in consultation with institute guide.
2. The group must review sufficient literature (reference books, journal articles, conference papers, white papers, magazines, web resources etc.) in relevant area on their project topic as decided by the guide.
3. Internal guide shall define a project statement based on the study by student group.
4. Students should identify individual seminar topic based on the project undertaken in consultation with guide.
5. Seminar topics should be based on project undertaken. Guide should thoughtfully allocate seminar topics on different techniques to solve the given problem (project statement), comparative analysis of the earlier algorithms used or specific tools used by various researchers.
6. Research articles could be referred from IEEE, ACM, Science direct, Springer, Elsevier, IETE,CSI or

from freely available digital libraries like Digital Library of India (dli.ernet.in), National Science Digital Library, JRD Tata Memorial Library, citeseerx.ist.psu.edu, getcited.org, arizona.openrepository.com, Open J-Gate, Research Gate, worldwidescience.org etc.

7. The group shall present the study as individual seminars in 20 – 25 minutes.

Guidelines for Seminar Report

1. Each student shall submit two copies of the seminar report in a prescribed format duly signed by the guide and Head of the department/Principal.
2. First chapter of a project group may talk about the project topic. At the end of the first chapter individual students should begin with introduction of seminar topic and its objectives.
3. Broad contents of review report (20-25 pages) shall be
   i. Introduction of Project Topic
   ii. Motivation, purpose and scope of project and seminar
   iii. Related work (of the seminar title) with citations
   iv. Discussion (your own reflections and analysis)
   v. Conclusions
   vi. Project definition. (Short version of RUP's vision document if possible).
   vii. References in IEEE Format
4. Students are expected to use open source tools for writing seminar report, citing the references and plagiarism detection. (Latex, Lex for report writing ; Mendeley, Zatero for collecting, organizing and citing the resources; DupliChecker , PaperRater, PlagiarismChecker and Viper for plagiarism detection)

Guidelines for Seminar Evaluation

1. A panel of examiners appointed by University will assess the seminar externally during the presentation.
2. Attendance for all seminars for all students is compulsory.
3. Criteria for evaluation
   i. Relevance of topic - 05 Marks
   ii. Relevance + depth of literature reviewed- 10 Marks
   iii. Seminar report (Technical Content) - 10 Marks
   iv. Seminar report (Language) - 05 Marks
   v. Presentation Slides - 05 Marks
   vi. Communication Skills - 05 Marks
   vii. Question and Answers - 10 Marks

Guidelines for Seminar Presentation

1) A panel of examiner will evaluate the viability of project scope and seminar delivery.
2) Oral examination in the form of presentation will be based on the project and seminar work completed by the candidates.
3) Seminar report must be presented during the oral examination.

References

1. Sharon J. Gerson, Steven M. Gerson, Technical Writing: Process and Product, Pearson Education Asia, ISBN :130981745, 4th Edition.
2. Andrea J. Rutherfoord, Basic Communication Skills for Technology, Pearson Education Asia, 2nd Edition.
3. Lesikar, Lesikar's Basic Business Communication, Tata McGraw, ISBN :256083274, 1st Edition.

Faculty of Engineering

Syllabus

B.E. (Information Technology) 2012 Course

(With effect from Academic Year 2015 - 16)

SAVITRIBAI PHULE PUNE UNIVERSITY

THE SYLLABUS IS PREPARED BY:

B.O.S. in Information Technology, Savitribai Phule Pune University

B.E. (Information Technology) 2012 Course to be implemented from June 2015

SEMESTER – I

Subject Code	Subject	Teaching Scheme			Examination Scheme					Total Marks
		Lecture	Practical	Tutorial	In-Semester Assessment Phase - I	TW	PR	OR	End Semester Examination Phase - II	
414453	Information and Cyber Security	3			30				70	**100**
414454	Software Modeling and Design	3			30				70	**100**
414455	Machine Learning	4			30				70	**100**
414456	Elective – I	3			30				70	**100**
414457	Elective – II	3			30				70	**100**
414458	Software Laboratory - III	--	4	--		50	--	50		**100**
414459	Software Laboratory - IV	--	4	--		--	50	50		**100**
414460	Project Phase I	--	--	2		50	--	--		**50**
Total		**16**	**8**	**2**	**150**	**100**	**50**	**100**	**350**	**750**

Software Laboratory – III: (Information and Cyber Security + Machine Learning)
Software Laboratory – IV: (Software Modeling and Design + Testing)

Elective – I	Elective – II
414456 A : Soft Computing	414457 A : Business Intelligence
414456 B : Usability Engineering	414457 B : Service Oriented Architecture
414456 C : Modern Compilers	414457 C : E&M Governance
414456 D : Parallel Algorithms and Design	414457 D : Geo Informatics Systems
414456 E : Cloud Computing	414457 E : Natural Language Processing

SEMESTER – II

Subject Code	Subject	Teaching Scheme			Examination Scheme					Total Marks
		Lecture	Practical	Tutorial	In-Semester Assessment Phase - I	TW	PR	OR	End Semester Examination Phase - II	
414461	Distributed System	3			30				70	**100**
414462	Advanced Databases	3			30				70	**100**
414463	Elective – III	3	2	--	30	25	--	25	70	**150**
414464	Elective – IV	3			30				70	**100**
414465	Software Laboratory - V	--	2	--		25	25	--		**50**
414466	Software Laboratory - VI	--	4	--		--	50	50		**100**
414467	Project Work	--	--	6		50	--	100		**150**
Total		**12**	**8**	**6**	**120**	**100**	**75**	**175**	**280**	**750**

Software Laboratory – V: (Distributed Systems)
Software Laboratory – VI: (Advanced Databases)

Elective – III	Elective – IV
414463 A :Mobile Computing	414464 A :Bio Informatics
414463 B :Advanced Graphics and Animation	414464 B :Real Time and Embedded Systems
414463 C :Information Storage and Retrieval	414464 C :Green IT - Principles and Practices
414463 D :IT Enabled Services	414464 D :Internet of Things
414463 E :Advanced Computer Networks	414464 E :Open Elective

414460 : PROJECT PHASE - I

Teaching Scheme:
Tutorial : 2 Hours/Week

Examination Scheme:
Term work : 50 Marks

Prerequisites: Project Based Seminar.

Course Objectives :

1. The practical implementation of theoretical knowledge gained during the study from FE to TE.
2. The student should be able implement their ideas/real time industrial problem/ current application of their engineering branch which they have studied in curriculum.
3. To build confidence in the student what he has learnt theoretically.
4. The dependent study of the state of the art topics in a broad area of his/her specialization.

Course Outcomes :

At the end of this course the student should be able to show preparedness to study independently in chosen domain of Information Technology and programming languages and apply to variety of real time problem scenarios.

Contents

Project Based Seminar (PBS) helped students to gather, organize, summarize and interpret technical literature with the purpose of formulating a project proposal in third year as part of course **314456 : Seminar& Technical Communication Laboratory.** They also submitted a technical report summarizing state-of-the-art on an identified topic.

B.E. Projects can be two types: Projects based on implementation of any application oriented problem, which will be more or less experimental in nature, and the others will be based on some innovative/ theoretical work.

In Project Phase-I the student will undertake same project over the academic year, which will involve the analysis, design of a system or sub system in the area identified earlier in the field of Information Technology and Computer Science and Engineering. In some cases; if earlier identified project is not feasible; a new topic must be formulated in consultation with the guide and project coordinator.

The project will be undertaken preferably by a group of **3-4 students** who will jointly work and implement the project. The group will select a project with approval from a committee formed by the department of senior faculty to check the feasibility and approve the topic.

Review Committee:

The Head of the department/Project coordinator shall constitute a review committee for project work for project group; project guide would be one member of that committee by default. There shall be at least two reviews in semester-I and semester-II by the review committee. The students or project group shall make presentation on the progress made by them before the committee. The record of the remarks/suggestions of the review committee should be properly maintained and should be made available at the time of examination.

Each student/group is required to give presentation as part of review for 10 to 15 minutes followed by a detailed discussion.

Semester - I

Review 1: Finalization of scope – the objectives and scope of the project should be finalized in second week of their academic semester. Should finalize list of required hardware, software or other equipment for executing the project, test environment/tools.

Review 2: Finalization of SRS – High level design, planning with CPM/PERT chart etc in the sixth week of their academic semester.

Semester – II

Review 3: Implementation Status and testing document.

Review 4 : Final Project Demonstration, Project Report and proper Result analysis

Guidelines for Students and Faculty:

Project Review Committee:

1. This committee will be responsible for evaluating the timely progress of the projects and communicating the progress report to the students.
2. As far as possible Students should finalize the same project title taken for Project Based Seminar (PBS).
3. Review committee should conduct "Feasibility Review" in first week after commencement of the term. Review committee should finalize the scope of the project.
4. If change in project topic is unavoidable then the students should complete the process of project approval by submitting synopsis along with the review of important papers. This new project topic should be approved by review committee.

Term Work:

1. The term work will consist of a report prepared by the student on the project allotted to them.
2. They should use appropriate tools for the preparation of the report like project planning, UML diagram, testing tools, referencing tools etc.

Report Structure

- Contents
- List of Abbreviations
- List of Figures
- List of Graphs
- List of Tables
    1. Introduction and aims/motivation and objectives
    2. Literature Survey
    3. Problem Statement
    4. Project Requirements
    5. System Analysis Proposed Architecture/ high level design of the project
    6. Verification Validation
    7. Project Plan
    8. Conclusion
- References
- Appendices
    A. Base Paper(s)

B. Plagiarism Report from any open source

Evaluation Guidelines:

A panel of examiner will evaluate the viability of project / project scope. The panel will also verify that all the suggestions/comments in the review document are taken care and accordingly allot the term work marks. Oral examination in the form of presentation will be based on the project work completed by the candidates. Preliminary report must also be presented during the oral examination.

414467 : PROJECT WORK

Teaching Scheme:
Tutorial : 6 Hours/Week

Examination Scheme:
Term work : 50 Marks
Oral : 100 Marks

Prerequisites :BE-Project Phase I – Semester I, Project Based Seminar

Course Objectives :

1. To expose students to product development cycle using industrial experience, use of state of art technologies.
2. To encourage and expose students for participation in National/International paper presentation activities and funding agency for sponsored projects.
3. Exposure to Learning and knowledge access techniques using Conferences, Journal papers and anticipation in research activities.

Contents

Reviews3: Based on Implementation (50% implementation expected)

Reviews4: Complete Project and Testing

Project Exhibition: All TE students must see all the projects in the exhibition

The group will submit at the end of semester II.

a) The Workable project.
b) Project report (in Latex/Lyx/latest Word) in the form of bound journal complete in all respect – 1 copy for the Institute, 1 copy for guide and 1 copy of each student in the group for certification.

The project report contains the details.

1. Problem definition
2. Requirement specification
3. System design details (UML diagrams)
4. System implementation – code documentation – dataflow diagrams/ algorithm, protocols used.
5. Test result and procedure – test report as per ATP.
6. Conclusions.
7. Appendix
    a. Tools used
    b. References
    c. Papers published/certificates

Plagiarism Report of paper and project report from any open source tool

One paper should be published in reputed International conference/International journal

Savitribai Phule Pune University

FACULTY OF ENGINEERING

Structure for the

T.E (Electronics and Telecommunication Engineering)

(2015 Course)

(w.e.f . June 2017)

Third Engineering-E&TC (2015 Course)

(With effect from Academic Year 2017-18)

Semester II												
Course Code	**Course**	**Teaching Scheme Hours / Week**			**Semester Examination Scheme of Marks**						**Credit**	
		Theory	**Tutorials**	**Practicals**	**In-Sem**	**End-Sem**	**TW**	**PR**	**OR**	**Total**	**TH/TW**	**PR +OR**
304186	Power Electronics	4	--	--	30	70	--	--	--	100	4	--
304187	Information Theory, Coding and Communication Networks	4	--	--	30	70	--	--	--	100	4	--
304188	Business Management	3	--	--	30	70	--	--	--	100	3	--
306189	Advanced Processors	4	--	--	30	70	--	--	--	100	4	1
304190	System Programming and Operating Systems	3	--	--	30	70		--	--	100	3	1
304194	Power and ITCT Lab	--	--	4	--	--	50	50	--	100	--	2
304195	Advanced Processors and System Prograaming. Lab	--	--	4	--	--	50	50	--	100		
304196	Employability Skills and Mini Project	2	--	2	--	--	--	--	50	50	2	1
	Audit Course 4	--	--	--	--	--	--	--	--	--		
	Total	20	---	10	150	350	100	100	50	750		
										Total Credits	**25**	

Abbreviations:

TH: Theory **OR: Oral**
TW: Term Work **PR: Practical**

Note: Interested students of T.E (Electronics/E&TC) can opt any one of the audit course from the audit courses prescribed by BoS (Electronics/Computer/IT/Electrical/Instrumentation)

304196 Employability Skills and Mini Project

Credits: TH-02 PR-01

Teaching Scheme:

Lecture : 02 hr/week

Practical : 02 hr/week

Examination Scheme:

Oral : 50 Marks

Course Objectives:

- To understand the "Product Development Process" including budgeting through Mini Project.
- To plan for various activities of the project and distribute the work amongst team members.
- To inculcate electronic hardware implementation skills by -
- Learning PCB artwork design using an appropriate EDA tool.
- Imbibing good soldering and effective trouble-shooting practices.
- Following correct grounding and shielding practices.
- To develop student's abilities to transmit technical information clearly and test the same by delivery of Seminar based on the Mini Project.
- To understand the importance of document design by compiling Technical Report on the Mini Project work carried out.

Course Outcomes:

On completion of the course, student will be able to

1. Understand, plan and execute a Mini Project with team.
2. Implement electronic hardware by learning PCB artwork design, soldering techniques, testing and troubleshooting etc.
3. Prepare a technical report based on the Mini project.
4. Deliver technical seminar based on the Mini Project work carried out.

Course Contents

Execution of Mini Project

- Project group shall consist of **not more than 3** students per group.
- Mini Project Work should be carried out in the Design / Projects Laboratory.
- Project designs ideas can be necessarily adapted from recent issues of electronic design magazines Application notes from well known device manufacturers may also be referred.

- Use of Hardware devices/components is mandatory.
- Layout versus schematic verification is mandatory.
- Bare board test report shall be generated.
- Assembly of components and enclosure design is mandatory.

B: Selection: Domains for projects may be from the following, but not limited to:

- Instrumentation and Control Systems
- Electronic Communication Systems
- Biomedical Electronics
- Power Electronics
- Audio , Video Systems
- Embedded Systems
- Mechatronic Systems

- Microcontroller based projects should preferably use Microchip PIC controllers/ATmega controller/AVR microcontrollers.

C. Monitoring: (for students and teachers both)

Suggested Plan for various activities to be monitored by the teacher.

Week 1 & 2: Formation of groups, Finalization of Mini project & Distribution of work.

Week 3 & 4: PCB artwork design using an appropriate EDA tool, Simulation.

Week 5 to8:PCB manufacturing through vendor/at lab, Hardware assembly, programming (if required) Testing, Enclosure Design, Fabrication etc

Week 9 & 10: Testing of final product, Preparation, Checking & Correcting of the Draft Copy of Report

Week 11 & 12: Demonstration and Group presentations.

Log book for all these activities shall be maintained and shall be produced at the time of examination.

D. Report writing

- A project report with following contents shall be prepared:
    - Title
    - Specifications
    - Block diagram
    - Circuit diagram
    - Selection of components, calculations

- Simulation results
- PCB artwork
- Layout versus schematic verification report
- Testing procedures
- Enclosure design
- Test results

  Conclusion
- References

Text Books:

1. Thomas C Hayes, Paul Horowitz,, "The Art of Electronics",Newens Publication

2. Analog Circuit Design: Art, Science and Personalities, by Jim Williams (Editor) , EDN series for Design Engineers,

3. M Ashraf Rizvi,‟ Effective Technical Communication‟, Tata McGraw Hill Education Pvt. Ltd.

Reference Books:

1. . Robert Boylested, " Essentials of Circuit Analysis", PHI Puublications
2. Meenakshi Raman, Sangeeta Sharma,‟ Technical Communication, Principles and Practice‟, Oxford University Press
3. A.E. Ward, Angus, " Electronic Product Design", Stanley thornes Publishers, UK.
4. C Muralikrishna, Sunita Mishra,‟ Communication Skills for Engineers‟, Pearson

Savitribai Phule Pune University, Pune

BE(Electronics & Telecommunication)

(2012 course revised syllabus)

(w.e.f. June 2015)

BE (E & TC) Structure
2012 Course w.e.f. June 2015
Semester-I

Subject Code	Subject	Teaching Scheme			Examination Scheme					Marks
		LECT	TUT	PR	In Semester Assessment Phase I	PR	OR	TW	End Semester Examination Phase II	Total
404181	VLSI Design & Technology	3			30				70	100
404182	Computer Networks	3			30				70	100
404183	Microwave Engineering	4			30				70	100
404184	Elective I	3			30				70	100
404185	Elective II	3			30				70	100
404186	Lab Practice I (CN & MWE)			4			50	50		100
404187	Lab Practice II (VLSI &Elective I)			4		50		50		100
404188	Project Phase I		2				50			50
	Total	**16**	2	8	150	50	100	100	350	750

Elective I

1. Digital Image Processing
2. Embedded Systems & RTOS
3. Software Defined Radio
4. Industrial Drives and Control

Elective II

1. Multi rate & Adaptive Signal Processing
2. Electronic Product Design
3. PLCs and Automation
4. Artificial Intelligence

Semester-II

Subject Code	Subject	Teaching Scheme			Examination Scheme					Marks
		LECT	TUT	PR	In Semester Assessment Phase I	PR	OR	TW	End Semester Examination Phase II	Total
404189	Mobile Communication	4			30				70	100
404190	Broadband Communication Systems	4			30				70	100
404191	Elective III	3			30				70	100
404192	Elective IV	3			30				70	100
404193	Lab Practice III(MC & BCS)			4			50	50		100
404194	Lab Practice IV(Elective III)			2		50		50		100
404195	Project Phase II		6			50		100		150
	Total	**14**	**6**	**6**	**120**	**100**	**50**	**200**	**280**	**750**

Elective III

1. Speech & Audio Signal Processing
2. RF Circuit Design
3. Audio Video Engineering
4. Soft Computing

Elective IV

1. Biomedical Signal Processing
2. Nano Electronics & MEMS
3. Detection & Estimation Theory
4. Wireless Networks
5. Open Elective*

***Any one subject from the list of Elective IV of computer/IT/Electrical/Instrumentation or Institute can offer elective IV based on any industry need with prior approval from BoS(Electronics). Repetition of subjects or topics is to be avoided.**

Dr. D. S. Bormane
Chairman, BOS(Electronics)

Project Phase-I (404188)

Teaching Scheme: Tutorial: 2Hrs/week		**Examination Scheme:** TW:50Marks

Note:

1. Term work assessment is based on the project topic. It consists of Literature Survey and basic project work. The abstract of the project should be submitted before Term work assessment.

2. The report consists of the Literature Survey, basic project work and the size of the report should be maximum of 40 pages.

3. The examination is conducted by two examiners (internal and external) appointed by the university. The examiners appointed must have minimum 5 years of experience with UG qualification or 2 years with PG qualification.

4. The assessment is based on Innovative Idea, Depth of understanding, Applications, Individual contributions, presentation, and the grade given by the internal guide based on the work carried out in a semester.

5. A certified copy of report is required to be presented to external examiner at the time of final examination.

Lab Practice - IV (404194)

Teaching Scheme:		Examination Scheme:
Practical: 2Hrs/week		PR: 50Marks TW:50Marks

Elective III

Experiments to be chosen based on Elective III. **(Minimum 8 experiments are to be performed).**

Project Phase-II (404195)

Teaching Scheme:		Examination Scheme:
Tutorial: 6Hrs/week		TW:100 Marks OR: 50 Marks

1. Group Size

The student will carry the project work individually or by a group of students. Optimum group size is in 3 students. However, if project complexity demands a maximum group size of 4 students, the committee should be convinced about such complexity and scope of the work.

2. Selection and approval of topic

Topic should be related to real life application in the field of Electronics and Telecommunication

OR

Investigation of the latest development in a specific field of Electronics or Communication or Signal Processing

OR

The investigation of practical problem in manufacture and / or testing of electronics or communication equipment

OR

The Microprocessor / Microcontroller based applications project is preferable.

OR

Software development project related to VHDL, Communication, Instrumentation, Signal Processing and Agriculture Engineering with the justification for techniques used / implemented is accepted.

OR

Interdisciplinary projects should be encouraged. The examination will be conducted independently in respective departments.

3. Note:

The group should maintain a logbook of activities. It should have entries related to the work done,problems faced, solution evolved etc., duly signed by internal and external guides.

Project report must be submitted in the prescribed format only. No variation in the format will be accepted. One guide will be assigned at the most 3 project groups.